



# BEYOND THE CURVE

How can data help ensure that COVID economic recovery drives net-zero behaviours?



ARUP

# Beyond the Curve

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# Introduction

As we enter the second year of the global Covid-19 pandemic the impact is being felt in our economy and society. This has led to many countries and governing bodies to reform budgets and development plans to help reduce the vulnerabilities caused by Covid-19 and address the physical, social, environmental, and economic recovery of impacted communities.

Building back better requires countries to harness low-carbon investment opportunities, reducing greenhouse gas emissions and air pollution, creating employment opportunities, and becoming more resilient to future shocks and stresses.<sup>1</sup>

The sudden shock of the global lockdown in March 2020 resulted in an unprecedented drop in human activity, with travel and movement coming to a halt and factories ceasing operations. Estimates from the Global Carbon Project suggest that emissions from fossil fuel fell by 7% in 2020 compared to 2019, the largest annual decline in emissions ever recorded.<sup>2</sup> Despite this short-term reduction in emissions, the impact on global temperatures is only minimal and will only be around 0.01 °C lower as a result of Covid-19.<sup>3 4</sup> Successive lockdowns and temporary closures of the economy are not a sustainable way to tackle climate change. Climate change is still a threat which will need to be prioritised in recovery plans. In 2021, global energy demands are expected to increase by 4.6%, offsetting any previous contraction in 2020.<sup>5</sup>

With the global rollout of Covid-19 vaccines and the widespread fiscal response to the economic shock there is expected to be a socio-economic rebound in 2021, particularly in energy demand. The International Energy Agency 2021 report estimates that global economic output in 2021 will rebound by 6%, increased the global GDP 2% higher than 2019 levels. With this economic rebound it is expected that the demand for coal will increase by 4.5% in 2021 and natural gas demand is set to grow by 3.2%.<sup>6</sup>

Cities are on the frontline of the Covid-19 response, playing a crucial role in operationalising recovery investments. Covid-19 measures forced many cities to devise short term and crisis management responses, but now cities must begin

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<sup>1</sup> <https://www.wri.org/initiatives/coronavirus-recovery>

<sup>2</sup>

<https://www.carbonbrief.org/global-carbon-project-coronavirus-causes-record-fall-in-fossil-fuel-emissions-in-2020>

<sup>3</sup> <https://www.bbc.com/future/article/20210312-covid-19-paused-climate-emissions-but-theyre-rising-again>

<sup>4</sup> <https://advances.sciencemag.org/content/7/10/eabf7133.full>

<sup>5</sup> <https://www.iea.org/reports/global-energy-review-2021>

<sup>6</sup> <https://www.iea.org/reports/global-energy-review-2021>

to shape long-term recovery strategies which focus on more inclusive, greener, and smarter development.<sup>7</sup>

As such, informed decision-making at city level will be key to support a shift towards more sustainable development. Digitalisation is a crucial transformation which is essential to achieving the UN SDGs and the goals set out in the European Green Deal. The European Commission is working on a digital transformation which prioritises developing trustworthy technology, fosters and open and democratic society, enables a sustainable economy and also helps towards tackling climate change.<sup>8</sup>

In the past two decades, cities have invested in technology infrastructure and capabilities to address environmental, social, political and economic issues. Yet technology innovation initiatives are highly dependent on access to quality data from multiple sources.

Sustainability reporting is only as impactful as the quality of data being gathered and assessed. Deloitte's 2021 Climate Check surveyed 750 executives worldwide between January and February 2021. It found that 28% of investors and companies cite the lack of regulatory reporting standards on climate-issues as one of the main obstacles in becoming more sustainable. Further, 23% of respondents state that it's hard to measure the impact their companies are making on the environment.

Unresolved questions relating to ownership, aggregation, privacy, and informed consent are some key barriers that are hindering the progress of data sharing across city stakeholders in the private and public sector.

'Beyond the Curve' explores the role of data in ensuring that COVID economic recovery is directed to drive net-zero behaviours and sustainable development at city level across the UK and Europe. The report identifies three use cases which demonstrate the use of data sharing governance and infrastructure to achieve strategic sustainability objectives.

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<sup>7</sup> <https://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/>

<sup>8</sup>

[https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en)

# Macrotrends

## An unprecedented economic and social shock

The introduction of COVID-19 control measures across the world since March 2020 have caused an unprecedented shock for the world's economy. Advanced economies including Europe, the US and Japan have been hit the hardest, while emerging markets, particularly China, have seen less restricting containment measures which resulted in less dramatic losses.

In the second quarter of 2020, the GDP of OECD countries had dropped by 9.8%, a significantly larger decrease than the -2.3% recorded in the first quarter of 2009, at the height of the financial crisis. The UK's GDP has been one of the most affected, with a drop of 20.4%.<sup>9</sup>

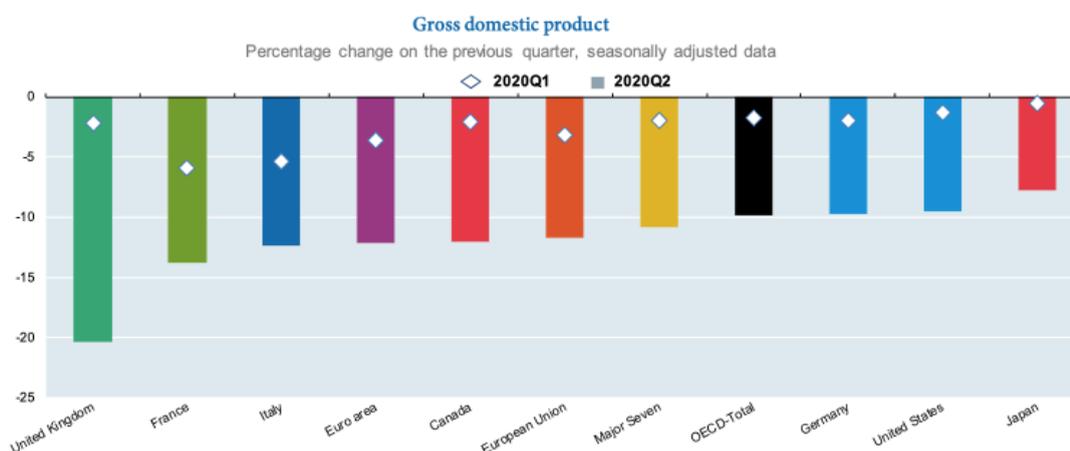


Figure 1 GDP percentage change on the previous quarter, seasonally adjusted data. Source: OECD<sup>10</sup>

In response to this reduction to economic output, governments in advanced economies have put in place job retention schemes to stave off unemployment. Yet with these measures being sustainable only in the short term, advanced economies could see a steep rise in unemployment.

The IMF estimates that 97.3 million individuals, or roughly 15% of the workforce in OECD countries are classified as being at high risk of being furloughed or made redundant.<sup>11</sup> McKinsey estimates that in the UK about 7.6 million jobs are at risk based on a scenario forecasting an overall 9% fall in national GDP in

<sup>9</sup> <https://www.oecd.org/sdd/na/GDP-Growth-Q220.pdf>

<sup>10</sup> <https://www.oecd.org/sdd/na/GDP-Growth-Q220.pdf>

<sup>11</sup>

<https://www.imf.org/-/media/Files/Publications/WP/2020/English/wpia2020088-print-pdf.ashx#:~:text=We%20estimate%20that%20over%2097.3,emerging%20countries%20in%20our%20sample.>

2020.<sup>12</sup> Allianz estimates that in the top 5 EU countries, 9 million workers currently employed in ‘late bloomer’ sectors including transport, accommodation & food services, arts & culture, retail and construction, are at high risk of losing their job in 2021 if job retention schemes end.<sup>13</sup>

## Rising Inequality

The reduction in economic activity has affected predominantly lower wage jobs and elementary occupations, putting those who were already vulnerable at further risk of unemployment. Poverty and inequality are predicted to increase across Europe, with poorer workers losing as much as 16% of income.<sup>14</sup>

### The pandemic will reverse progress in reducing world poverty

Share of world population living on up to \$1.90 a day, %

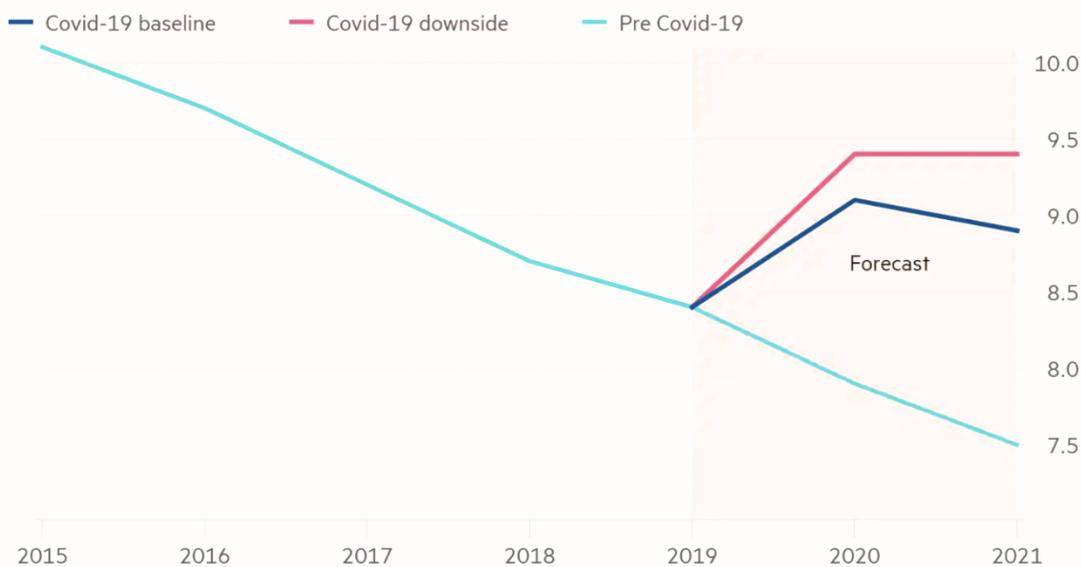


Figure 2 The pandemic will reverse progress in reducing world poverty. Adapted from Financial Times. Source: World Bank<sup>15</sup>

At the same time, the combined wealth of US billionaires increased by over \$637 billion to a total of \$3.6 trillion, which is considerably more than the entire wealth of the 54 countries on the African continent.<sup>16</sup>

<sup>12</sup>

<https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-in-the-united-kingdom-assessing-jobs-at-risk-and-the-impact-on-people-and-places#:~:text=We%20find%20that%20during%20lockdown,n.most%20vulnerable%20to%20job%20loss.>

<sup>13</sup> [https://www.allianz.com/en/economic\\_research/publications/specials\\_fmo/17062020\\_Labormarket.html](https://www.allianz.com/en/economic_research/publications/specials_fmo/17062020_Labormarket.html)

<sup>14</sup> <https://www.ox.ac.uk/news/2020-10-29-poverty-and-inequality-surge-across-europe-wake-covid-19>

<sup>15</sup> <https://www.ft.com/content/2a41fa8b-e5d1-4102-b14f-7ec5820a5d7d>

<sup>16</sup> <https://www.businessinsider.com/billionaires-net-worth-increases-coronavirus-pandemic-2020-7?r=US&IR=T>

**Half of the jobs classified as at risk pay less than £10 per hour.**

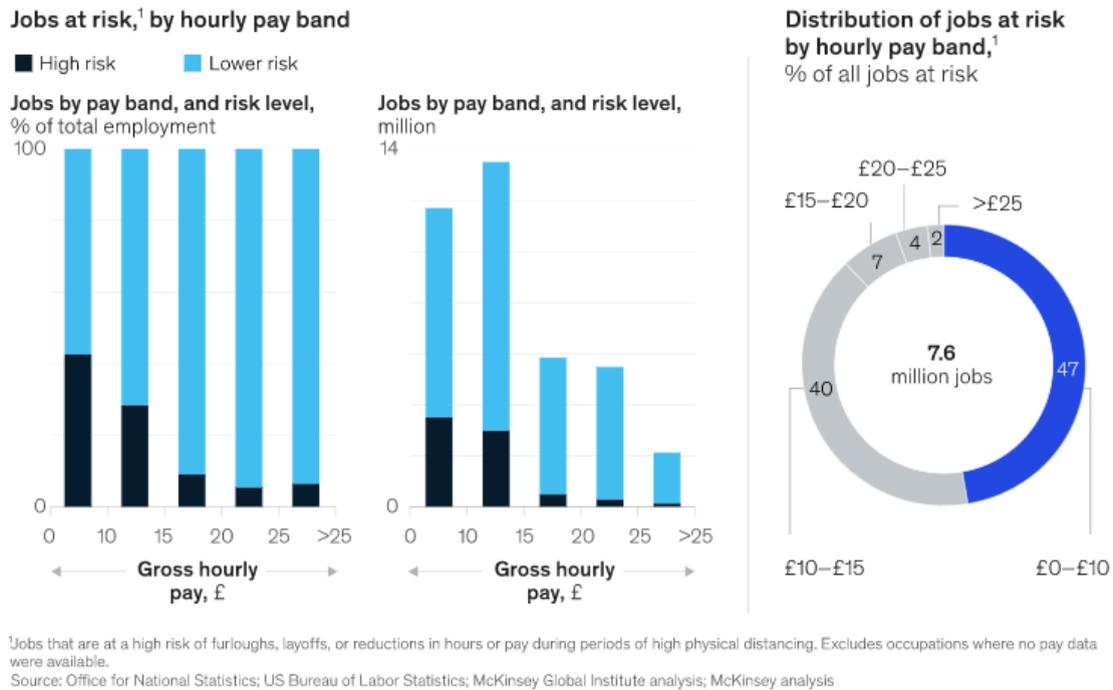


Figure 3 Half of the jobs classified at risk pay less than £10 per hour. Source: McKinsey & Company<sup>17</sup>

The immediate impact of restrictions has also exacerbated existing gender and racial inequalities. Female workers have been 1.8 times more vulnerable to job loss during the pandemic than male workers.<sup>18</sup> A study of New-York-based businesses shows that white and Asian-owned businesses had seen losses of income at rates of 17% and 26% respectively, while the rate for Latin- and black-owned businesses was 32% and 41%, more than twice that of white owned businesses.<sup>19</sup>

**Workforce transformation**

The profound crisis triggered by COVID 19 is accelerating the rate at which redundant jobs will need to be replaced to better fit emerging digitisation and process automation. This calls for investments in training and workforce development.

<sup>17</sup>

<https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-in-the-united-kingdom-assessing-jobs-at-risk-and-the-impact-on-people-and-places>

<sup>18</sup>

<https://www.mckinsey.com/featured-insights/future-of-work/covid-19-and-gender-equality-countering-the-regressive-effects>

<sup>19</sup> [https://www.nber.org/system/files/working\\_papers/w27309/w27309.pdf](https://www.nber.org/system/files/working_papers/w27309/w27309.pdf)

Employers surveyed by the World Economic Forum expect that by 2025, redundant roles will decline from being 15.4% of the workforce to 9% and that emerging professions will grow from 7.8% to 13.5% of their total employee base. Based on these assumptions, 85 million jobs will need to be replaced with jobs that are fit for complementing process automation. At the same time, 97 million new roles may emerge to fill this gap. In response to this trend, surveyed employers believe that 40% of workers will require reskilling.<sup>20</sup>

This radical acceleration of change in the economic fabric of our society presents an opportunity to accelerate an urgent transformation of our economy to achieve sustainable and equitable development towards net-zero targets. To do this, efforts should be focused on cities, where the majority of the world's economic activity takes place.

### **Remote Working and Office Culture**

As of 2019, only 5.4% of people employed in the EU worked from home and was common mainly for self-employed workers. Since Covid-19, early estimates suggest that close to 40% of employed people in the EU work from home. The prevalence of remote working is particularly high in knowledge and ICT intensive services and high-skilled professionals and managers were already used to working from home.<sup>21</sup> Beyond the Covid-19 pandemic over three-quarters of EU employees want to continue working from home occasionally, blending remote working and being present in the office.<sup>22</sup>

While office environments can help people thrive at work, offices can also contribute to the local economy. As we are unlikely to return to a 9 to 5 monofunctional office reimagining urban spaces to better integrate work and life experiences is essential. This will help create multifaceted destinations, resilient to changing work and life behaviours.<sup>23</sup> With 74% of professionals expecting remote work to become standard<sup>24</sup>, adopting hybrid models of working will be critical for maintaining office culture and the local area and businesses they support.

### **Impact on climate—emissions and energy consumption**

Global energy demand fell by 4% in 2020, the largest energy decline since World War II. However, projections for 2021 indicate as Covid-19 restrictions are lifted

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<sup>20</sup>

<https://fr.weforum.org/reports/the-future-of-jobs-report-2020/digest#:~:text=Employers%20expect%20that%20by%202025,employee%20base%20of%20company%20respondents>.

<sup>21</sup> [https://ec.europa.eu/jrc/sites/jrcsh/files/jrc120945\\_policy\\_brief\\_-\\_covid\\_and\\_telework\\_final.pdf](https://ec.europa.eu/jrc/sites/jrcsh/files/jrc120945_policy_brief_-_covid_and_telework_final.pdf)

<sup>22</sup> <https://www.eurofound.europa.eu/data/covid-19/working-teleworking>

<sup>23</sup> IPUT Making Place Report

<sup>24</sup> <https://voxeu.org/article/work-home-technology-boon>

demand for energy is set to rebound by 4.6% in 2021, .5% above pre-covid levels. Further, if transport demands return to their pre-Covid levels the demand for energy will rise even higher, almost 2% about 2019 levels.<sup>25</sup>

In 2020 global CO2 emissions declined by 5.8%, almost five times greater than the 2009 decline which followed the global financial crisis. However, the IEA project this to rebound and grow by 4.8% as demand for coal, oil and gas increases with post Covid-19 recovery.<sup>26</sup>

A green recovery is essential to help respond to climate change and complying with EU targets for reducing emissions. The IEA project that renewable energies are set to expand by more than 8%, with Solar PV and wind set to contribute two-thirds of renewables growth.<sup>27</sup>

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<sup>25</sup> <https://www.iea.org/reports/global-energy-review-2021/economic-impacts-of-covid-19#energy-demand>

<sup>26</sup> <https://www.iea.org/reports/global-energy-review-2021/co2-emissions#abstract>

<sup>27</sup> <https://www.iea.org/reports/global-energy-review-2021/renewables#abstract>

# The changing economic geography of cities

The restrictions introduced to control the spread of COVID-19 have forcibly transformed the lifestyles of most citizens, introducing new ways of working, living, shopping and playing. The ability of city decision makers to monitor and understand changing behaviours and the way they affect urbanisation patterns, usage of infrastructure and demand for services will be key to iteratively implement recovery initiatives and incrementally assess the success of new policies and investments in infrastructure.

While the evolution and consolidation of emerging behaviours is uncertain at present, the creative destruction process activated by COVID-19 is already changing the economic fabric of UK and European cities. The following is evidence of some emerging trends that are prominent across this spectrum.

## **A transition to remote work**

With the sudden introduction of travel restriction and social distancing measures, office workers had to adapt overnight to home working. Companies had no other alternative than accelerating the adoption of digital tools to enable collaboration.

The steep learning curve and disintegration of trust barriers have widened the acceptance of remote work. This has reinforced the already existing trend that has seen the workplace expanding into third spaces away from glass-cladded offices in the past decade.

There is initial evidence that people are inclined to continue working at home or away from the office for two or three days per week. A YouGov survey commissioned by Arup and IPUT Real estate shows that 50% of typically office-based employees who have worked remotely want to divide their work week equally between the office and the home in the future, and 28% would like to work remotely full time. A small 11% wants to go back to working most of the time in the office.

Through their survey of almost 150,000 employees in 88 countries, Leesman have found that the remote working experience had a positive impact on workers' productivity and wellbeing, with 82.5% employees stating that their domestic environments enables them to work productively and 72.2% reporting that working from home allows them to maintain a healthy work-life balance.

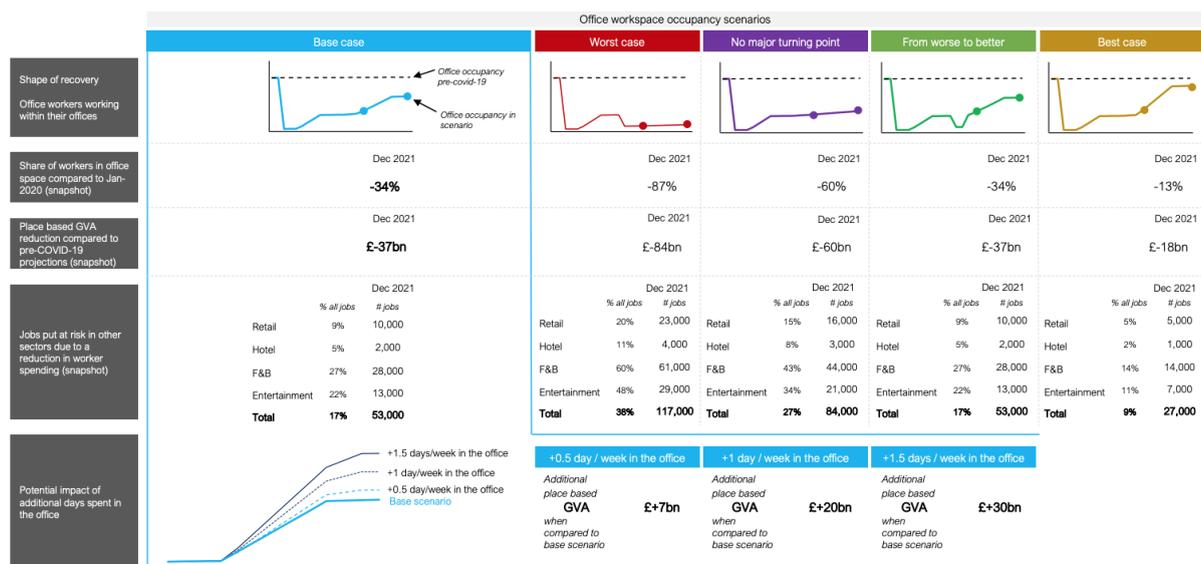
Despite the positive aspects of remote working, 84% of the employees surveyed by YouGov still see the office as a valuable place that provides the opportunity to socialise, with 79% believing that working in the office brings advantages for personal development and career advancement.

## The impact on Central Districts

The Central District is the commercial and business center of a city. While the outlook for the long-term relevance of central offices looks relatively positive, the sharp reduction of footfall in central business districts is already having short-term negative effects on sectors such as retail, entertainment, hospitality and accommodation. According to Savills, Central London retailers have already suffered a loss of £2.3 billion retail spend. Overall, the UK has seen a net loss of 7,834 retail units in the first half of the year, compared to a total loss of 9,169 units in 2019. This may be a symptom of the gradual return to a more mixed use for central high streets and commercial property, which has built up an excessive surplus of retail space. For example, the UK is estimated to have 25 to 30% more shopping space than needed.

A study conducted by Arup on potential recovery scenarios for Central London's economy shows a potential decline between £37 and 60bn in local economic activity with 53,000 to 84,000 jobs at risk of redundancy by the end of 2021 depending on the rate of footfall increase as people start returning to the office.

Figure 4. Office occupancy scenarios and impact on Central London economic recovery



These changes highlight an urgent need to rethink the role of city centres to support their attractiveness and their influence for cities' employment. The role

of public realm and streets will be particularly important in shaping a new character for central districts that creates new reasons for people to visit them.

### **The burgeoning 15-minute city**

Shorter commutes have enabled people to spend more time in their local neighbourhood. This has been reflected in a noticeable shift of economic activity in the outer, more suburban areas of cities. In London, outer businesses have seen sales grow by 7% from Q2 to Q3 in 2020. Forward-looking cities such as Paris and Milan had already initiated an intentional shift towards planning a '15-minute city', where essential services and amenities that improve quality of life are accessible within 15 minutes of cycling or walking. The uptake of this planning concept has gained momentum in the wake of COVID-19 – C40, a network of 97 of the world's largest cities, puts the 15-minute city at the core of their agenda for just and green recovery.

At the core of the 15-minute city lie shared micro mobility and active transport that enable decentralised connections across neighbourhoods with lower carbon emissions and a positive effect on people's health. Reclaiming the street to introduce more green and create opportunities for socialisation and play is another aspect that aims to revitalise the social resilience of communities and their biodiversity.

While the foundational principles of this planning approach are important enablers of more sustainable cities, a considerable amount of work and resources need to be mobilised to turn the concept of a 15-minute city into reality. For example, 47% of Londoners report that amenities are not close enough to their homes. The existing built fabric of European cities puts them in a position of advantage in repurposing existing physical and social infrastructure, while sprawling cities in the US and Australia will face more significant challenges in the provision of distributed public services.

With limited resources, local authorities will need to prioritise interventions according to fair criteria, in order to avoid the exacerbation of existing inequalities within their urban boundaries.

### **A new paradigm for public transport**

Transport systems of major cities have been designed to connect people with working and recreation opportunities within a 30 minutes journey on motorised (public or private) transport. Fleet capacity and infrastructure planning have been calibrated to optimise these journeys across two short daily peaks.

An increasingly positive attitude towards remote working, which has been illustrated in previous sections is also reflected in changing attitudes towards transport – nearly 40% of respondents to a survey of 854 citizens in Milan, Dublin and Madrid think they will maintain the mobility choices they have adopted after COVID-19. These changes radically questioned the foundations of traditional approaches to transport planning. For this reason, cities will have to refocus investments towards the redistribution of resources to provide convenient, safe and sustainable services for those workers who still need to travel to a physical workplace, while encouraging low carbon and active mobility options for those who work remotely. The scale of this transformation also needs to be mapped against the 2050 targets.

## Toward a green and equitable economic stimulus

In December 2020, the Council of the European Union and the European Parliament adopted the EU Regulations stemming from the Recovery Plan for Europe. This recovery plan will help to lead the way out of the crisis and lay the foundations for a more sustainable Europe. (€750bn) will be allocated to national governments on the basis of plans that they need to submit to the Commission.<sup>28</sup>

*“Those who act first and fastest will also be the ones who grasp the opportunities from the ecological transition. [...] But public finances alone will not be enough. We need to tap into private investment by putting green and sustainable financing at the heart of our investment chain and financial system.”* President Ursula von der Leyen, Political Guidelines, 16 July 2019

The European Recovery and Resilience Facility aims to mitigate the economic and social impact of the Covid-19 pandemic while simultaneously making European economies and societies more sustainable and resilient. The Facility will make available €672.5 billion in loans and grants available to support the necessary reforms and investments.<sup>29</sup>

Member states are typically responsible for EU initiatives, while some programmes are specifically targeted to certain industries. Through national government infrastructure expenditure and targeted income support to households and businesses, national stimulus packages can support cities and provide capital or operating grants. For example, these grants can flow directly from a national budget to municipal budgets.<sup>30</sup>

The implementation of recovery funds will require monitoring and reporting to ensure the achievement of the objectives of the funds. The European Commission will ensure that data for monitoring are collected efficiently, effectively and in a timely manner. By December 2021 the Commission will set out common indicators to be used for reporting on the progress of specific objectives and goals and define a specific methodology for reporting social expenditure.<sup>31</sup>

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<sup>28</sup> [https://ec.europa.eu/info/strategy/recovery-plan-europe\\_en](https://ec.europa.eu/info/strategy/recovery-plan-europe_en)

<sup>29</sup> [https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility\\_en](https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en)

<sup>30</sup>

[https://www.c40knowledgehub.org/s/article/How-cities-can-steer-national-and-international-finance-for-a-green-and-just-recovery?language=en\\_US](https://www.c40knowledgehub.org/s/article/How-cities-can-steer-national-and-international-finance-for-a-green-and-just-recovery?language=en_US)

<sup>31</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0241>

In line with the recommendations from the global Task Force on Climate-related Financial Disclosures (TCFD), the UK government has also proposed mandatory disclosures for large, privately held businesses as well as those with publicly listed shares. This proposal would help investors to better communicate climate risks and better understand the impact of their investment portfolios.<sup>32</sup>

Cities play an important role in achieving a sustainable recovery post-covid and each city will require a unique recovery strategy to the pandemic. Unfortunately, the pre-pandemic challenges faced by cities in how they access these resources to finance their operations still exist. National governments need to rethink their efforts by developing urban growth strategies and creating ways of accessing resources and support. Further, cities also need to engage with stakeholders and develop resources to help deliver social benefits through proper regulatory regimes, investing in resource capacity for revenue generation (both technical and administrative) to ensure that private and public resources are effectively deployed.<sup>33</sup>

The recovery from Covid-19 brings about opportunities for governments and local authorities to develop digitisation and data strategies which lay the foundation for sustainable recovery. For example, to enable a green and sustainable recovery, modernising member states public administration and addressing the data challenges could increase the effectiveness, efficiency, and relevance of government action. Some of the data challenges in public authorities include;

- Existing public websites and platforms are not state of the art and may not function on mobile devices,
- The benefits of using predictive analysis and AI, which can detect patterns which inform policy makers, is underutilised,
- Data from both public and private sources is often insufficiently assessed and used,
- Citizens are not aware of how their data is being stored and how much data public authorities may have about them.

The Covid-19 pandemic highlights the urgent need to develop digital solutions for public services.<sup>34</sup> Furthermore, the climate crisis is pushing relevant actors to collect better data to help evaluate the performance of assets and investments.<sup>35</sup>

<sup>32</sup> <https://www.reuters.com/article/us-climate-change-britain-finance-idUSKBN2BG1HQ>

<sup>33</sup>

<https://c40.my.salesforce.com/sfc/p/#36000001Enh/a/1Q000000gRrc/NLuVtEIJImUomOGhZgH3xY.G1EMuY0hOXmUe96BP6Lg>

<sup>34</sup> [https://ec.europa.eu/info/sites/info/files/component\\_public\\_administration.pdf](https://ec.europa.eu/info/sites/info/files/component_public_administration.pdf)

<sup>35</sup> IPUT Shaping our Cities

# The role of data

As outlined in section (xx), there is a push from the European Commission and national governments to collect more data to help better observe, monitor and understand the impacts of climate change on cities and assets. Collecting and reporting on data is essential to help better understand progress towards climate objectives.

It is important that the data that is collected is usable to;

- help us better understand and address climate and environmental risks,
- radically improve our investments in, and planning and management of our global infrastructure and services
- generate distributed innovation that can support the growth of sustainable enterprises

## Data Gaps

We continue to grow exponentially richer in data every day, however, the process of data collection, access, sharing, and usage are, at best, not fit for purpose. Today, the majority of corporate environmental sustainability data published are delivered 'somewhere online', often in a PDF format, often inconsistently, in ways that are then aggregated into portals or commercial services that then attempt to translate them into value or risk assessments. There are substantial gaps in the materiality of much of this data, it is often incomplete or not 'actionable'.

Data represents a snapshot of the world and often the real story and context behind the data can get lost. As we move forward with the push to collect more data it is imperative that the data is contextual and can be translated into an analysis we can use. A one-size fits all approach to data does not allow for thoughtful analysis which frames the questions that need answering, but rather a predefined analysis.<sup>36</sup>

## The Case for Data Sharing

While there is an ocean of available capital, the lack of comprehensive, trusted and quality data-flow is leading to a misallocation of resources, missed opportunities and is creating catastrophic risks on our global balance sheets. Our infrastructure for accessing this data is as important as our physical

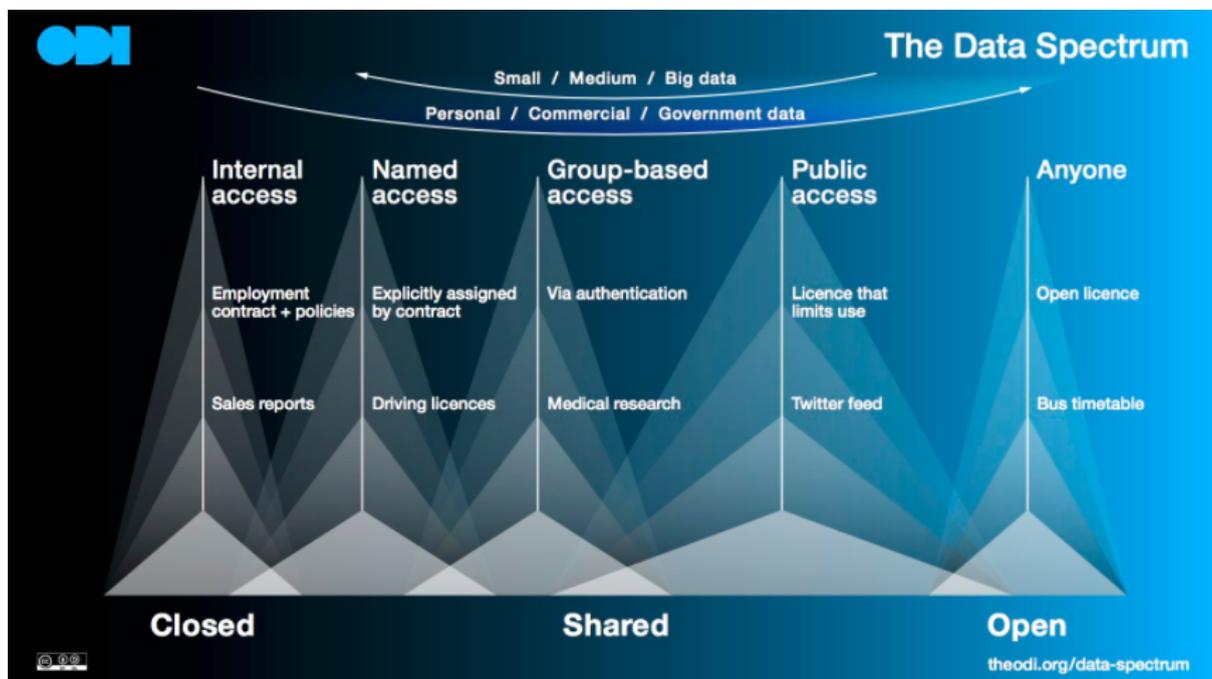
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<sup>36</sup> <http://giorgialupi.com/data-humanism-my-manifesto-for-a-new-data-world>

infrastructure in averting our climate, biodiversity and related crises, but it is being dangerously neglected.

There are a number of different approaches for improving the access to data and open models for building and maintaining data infrastructure. The possibilities of data flows hang on the differentiation of access rights to data and the understanding that some data is Closed, some Open and—crucially— the rights around data that can be called Shared. The default data sharing agreements provide the opportunity for organisations to engage with stakeholders to share data. Building a shared approach for data requires a mutual understanding of the benefits of sharing data, and also the infrastructure and governance mechanisms needed to support its use.<sup>37</sup>

The diagram below illustrates different examples of sharing data across the spectrum; closed, shared and open.



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### Open Data

Open data is data which is published under an open licence and it is made available by anyone, for any purpose for free.<sup>39</sup>

37

<https://www.arup.com/perspectives/publications/research/section/exploring-new-approaches-for-sharing-data-in-the-built-environment>

38 <https://theodi.org/wp-content/uploads/2018/02/Screen-Shot-2018-02-27-at-12.42.42.png>

39

<https://www.arup.com/perspectives/publications/research/section/exploring-new-approaches-for-sharing-data-in-the-built-environment>

## Closed Data

Closed data is data which is held privately within an organisation. For example, a bilateral contract for a specific project, or access to information enabled via an employment contract.

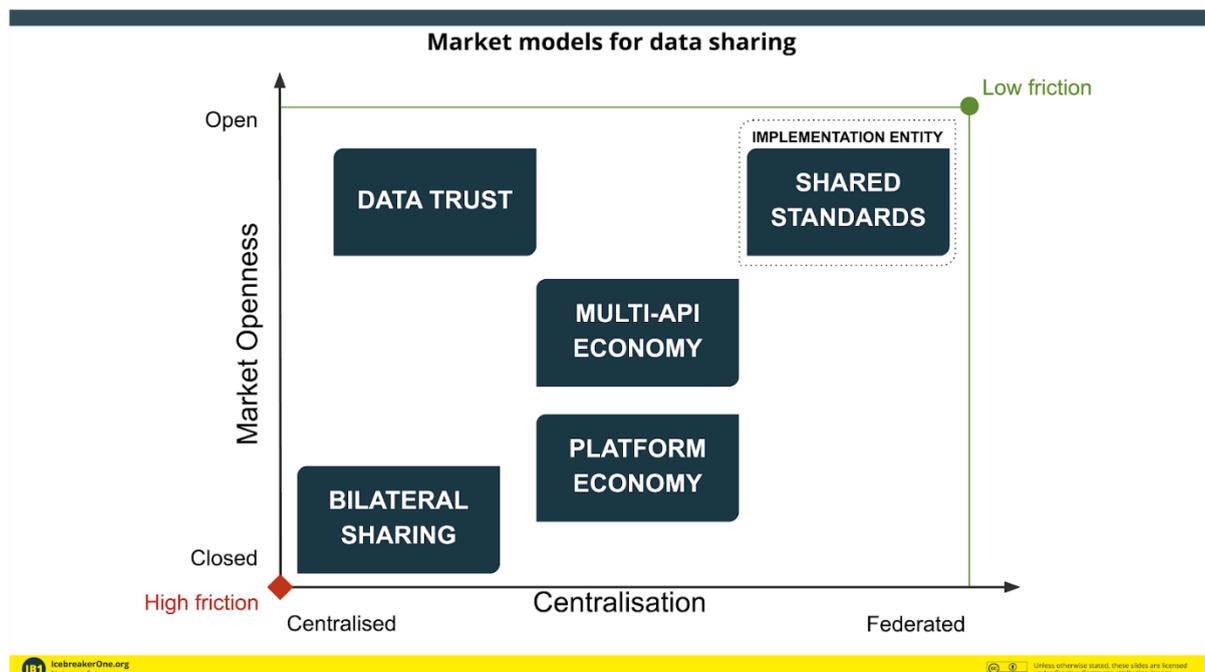
## Shared Data

Shared Data is data that is accessible under a predefined set of rules (e.g. on who can access it, for which uses, under which conditions). Data that is shared will usually be made available for specific purposes that are predefined by, for example, a data sharing agreement. There are many ways to share data and make data accessible to others.

## Approaches to Data Sharing

Data sharing agreements are the typical model for sharing data between two organisations. These are legal contracts and define how data will be shared, the purpose for sharing data and the roles and responsibilities for the organisations involved.

Below, we consider six models that enable better flows of data. These are different models for data sharing. Our axes are **market openness** (how easy is it to enter, participate or collaborate) and **centralisation** (how does the market design influence data flows).



## *Bilateral Sharing*

The current default is Bilateral Sharing: one organization sends data to another based on a request. It is often achieved using a bilateral contract to address legal terms. This method can help build relationships between partners and define specific controls over data use. However, these contracts can be difficult to negotiate, costly and time consuming. They are typically designed for 1:1 data sharing so is difficult to replicate. Data is usually unstructured, and reports are not machine ready, meaning that it is difficult to reuse the data for other purposes.

## *Platforms*

A data platform allows data located in databases to be governed, accessed and delivered to users. Platforms are core to most organisational strategies, providing a cohesive view of data from multiple sources and unlocks huge value for the surrounding ecosystem by removing transactional friction.

Platforms enable sector-wide alignment, enable and support data analysis across multiple organisations and provide a common technical platform for analysis, use and the onward sharing of data.

However, setting up and maintaining a data platform can be costly. Within organisations there are many existing silos which can lead to fragmentation across data services and infrastructure.

## *Multi-API Economy*

Much of the web today operates within the frame of a 'multi-API' economy. An API is a set of functions which allows different applications to access data and interact with external systems. APIs allow different software applications to communicate with each other and exchange data directly, without the need for human input each time. APIs allow developers to make requests for data.<sup>40</sup> APIs have enabled organisations that hold large amounts of data to become platforms for third party innovation.

## *Data Trusts*

Data Trusts steward data on behalf of communities. They involve a third party assuming a trustee duty to stewarding the data (acting with impartiality, prudence, transparency and undivided loyalty). Data trusts ensure that data is managed properly and isn't monopolised. A data trust builds upon the concept of a legal trust, where decisions are made about assets by a trust, and applies it

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<sup>40</sup> <https://www.bigcommerce.com/blog/what-is-an-api/#what-are-some-types-of-api-used>

to data. This is to ensure the most benefit for a group of organisations or people. These benefits could be creating new businesses, enabling research or accessing data for sustainability reporting.<sup>41</sup>

### *Shared Standards*

Shared standards facilitate data sharing and help align public and private sector organisations around a governance framework to help unlock data sharing at scale. Sharing data enables new streams of revenue to be created, reduces costs and improves efficiency. With **Shared Data**, if stakeholders publish their data descriptions and their licensing options per type of use (aka 'pre-emptive licensing'), then other stakeholders can access it — compliant to their respective licensing requirements. This can enable people to create different types of value exchange, including granular payment structures for different types of use.

Shared Data can be discovered by publishing an (open data) description of it (e.g. meta-data), that enables search engines to find it. If the licensing is clear, then the friction between discovery and usage is reduced.

Doing this increases the size of the observable dataverse and helps to unlock innovation while protecting the interests of individuals, organisations and countries to use it for both public and private good.

### **Pros and Cons of Solutions in Creating Data Flows**

These approaches outline modes of addressing data governance for access to Shared Data and can provide a framework to standardise access to Open data.

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<sup>41</sup> <https://theodi.org/article/defining-a-data-trust/>

	Pros	Cons
Shared standards	<ul style="list-style-type: none"> <li>Open marketplace</li> <li>Shared integration / interoperability framework</li> <li>Close regulatory linkage &amp; feedback loops</li> <li>Enables market-participants to self-organise</li> <li>Low transaction cost (common approach)</li> <li>Makes clear what should be 'competition'</li> <li>Multi-point, whole-system value creation</li> <li>Fast to integrate once in-place (adherence standards)</li> <li>Builds on architecture of the web</li> </ul>	<ul style="list-style-type: none"> <li>Higher initial effort to reach consensus</li> <li>Requires cultural alignment</li> <li>Requires cohesion between regulation and market actors</li> </ul>
Data trusts	<ul style="list-style-type: none"> <li>Centralised administration</li> <li>Governance a key focus</li> <li>Single integration point</li> <li>Single contracting point</li> </ul>	<ul style="list-style-type: none"> <li>Lack of willingness to share into it</li> <li>Hard to address diversity of needs</li> <li>May struggle to meet diverse user needs</li> <li>Difficult to adapt in an agile manner/brittle</li> </ul>
Multi-API	<ul style="list-style-type: none"> <li>Market-driven</li> <li>Quick-to-market</li> <li>Competitive at all levels</li> </ul>	<ul style="list-style-type: none"> <li>Multiple rules &amp; integrations</li> <li>Complex</li> <li>High cost to enter</li> <li>Monopoly-gating points emerge easily</li> </ul>
Platform economy	<ul style="list-style-type: none"> <li>High single-point value creation</li> <li>Centralises control</li> <li>Faster-to-market</li> <li>Structurally attractive to reflect existing bureaucracies</li> </ul>	<ul style="list-style-type: none"> <li>Lack of willingness to share into it</li> <li>Value flows easy to skew to monopolies</li> <li>Doesn't scale long-term</li> <li>Commercial friction on data value</li> <li>Not a 'web-first' strategy (reflects legacy thinking not 4th industrial revolution)</li> </ul>
Bilateral contract	<ul style="list-style-type: none"> <li>High single-point value creation</li> <li>Centralises control</li> <li>Faster-to-market</li> <li>Structurally attractive to reflect existing bureaucracies</li> </ul>	<ul style="list-style-type: none"> <li>High friction process (repeat for each relationship)</li> <li>Low/no reuse (unique to each use)</li> <li>Market inhibiting</li> <li>High cost</li> <li>Slow (3-9 month contract cycle)</li> </ul>

## Data sharing for the sustainable recovery of city – use cases

Addressing the challenges brought about by Covid-19 while simultaneously working towards tackling climate change requires new approaches and strategies. Highlighting the role data can have could bring about new solutions to help create sustainable and resilient cities.

We describe 3 use cases that suggest how data sharing governance and infrastructure could be used to facilitate the economic recovery of our cities in the years to come.

The disruption that covid has brought in the way people live in cities calls even more urgently for the need to capture and use operational data to inform decisions and empower citizens and businesses.

Through these use cases we want to highlight potential opportunities to align incentives of diverse stakeholders to enable data sharing that can help them create more sustainable cities

### The recovery of central districts and high streets

The EU has launched a recovery plan for Europe to help repair the economic and social damage caused by the COVID-19 pandemic.<sup>42</sup> The availability of funds will be linked closely to green and sustainable commitments from EU Member States.<sup>43</sup> Accessing these funds will require EU Member States to outline a plan for how they intend to use funds and ensure they comply with green and sustainable objectives outlined by the EU.<sup>44</sup>

To help investors and companies define which economic activities are environmentally sustainable a new legislation and classification method, the EU taxonomy, has been developed. The EU taxonomy places an obligation on companies to disclose and report on what proportion of their investments align with sustainable activities.<sup>45</sup> Non-financial data is also required to be published which should include information on how and to what extent activities are associated with sustainable activities.<sup>46</sup> The EU taxonomy will enable companies to collect reliable, consistent and comparable sustainability related indicators which can contribute to decision making while also fulfilling disclosure duties.<sup>47</sup>

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<sup>42</sup> [https://ec.europa.eu/info/strategy/recovery-plan-europe\\_en#a-clear-roadmap-towards-new-sources-of-revenue-to-help-repay-the-borrowing](https://ec.europa.eu/info/strategy/recovery-plan-europe_en#a-clear-roadmap-towards-new-sources-of-revenue-to-help-repay-the-borrowing)

<sup>43</sup> <https://www.refinitiv.com/perspectives/future-of-investing-trading/what-are-europes-prospects-for-a-just-recovery/>

<sup>44</sup> <https://www.refinitiv.com/perspectives/future-of-investing-trading/what-are-europes-prospects-for-a-just-recovery/>

<sup>45</sup> <https://www.greenstoneplus.com/blog/preparing-your-data-for-the-eu-taxonomy-regulation#:~:text=The%20EU%20Taxonomy%20is%20a%20regulatory%20classification%20system%20which%20helps%20align%20with%20sustainable%20activities>

<sup>46</sup> [https://www.esma.europa.eu/sites/default/files/library/esma30-379-471\\_final\\_report\\_-\\_advice\\_on\\_article\\_8\\_of\\_the\\_taxonomy\\_regulation.pdf](https://www.esma.europa.eu/sites/default/files/library/esma30-379-471_final_report_-_advice_on_article_8_of_the_taxonomy_regulation.pdf)

<sup>47</sup> [https://www.ev.com/en\\_lu/wealth-asset-management/luxembourg-market-pulse/eu-taxonomy-regulation](https://www.ev.com/en_lu/wealth-asset-management/luxembourg-market-pulse/eu-taxonomy-regulation)

Reporting on sustainability – environmental, social and governance issues (ESG) - is a crucial component of the global push towards sustainability practices. ESG reporting is essential for demonstrating sustainability and better understanding climate risk and awareness. Through collecting data, it is possible to better understand the impacts of climate change on real estate, predict future changes and optimise buildings accordingly. There are a number of certifications, such as CDP, TCFD, BREEAM and LEED, which help asset owners and operators to collect data and share this information to help support a more sustainable future.<sup>48</sup>

For investors, the EU taxonomy promotes transparency and strengthens the green credentials of the financial sector. However, reporting is limited by the existing data already out there. The main challenge for investors and asset owners is ensuring they will have sufficient data. A report launched in January 2021, *“Testing the application of the EU Taxonomy to core banking products: High level recommendations”* from the UNEP FI and European Banking Federation (EBF), assesses the extent of how the EU taxonomy can be applied to core banking products for labelling or disclosure purposes. A key challenge outlined when testing the EU taxonomy to transactions and clients is data availability, quality, and granularity.<sup>49</sup>

*“The availability of data is the single biggest challenge identified in the early application of the EU Taxonomy.”<sup>50</sup>*

The report recommends a global alignment of taxonomies to facilitate international data collection and to address the lack of coordination between the availability of corporate data and the application of the taxonomy.

As companies commit to reducing their carbon footprint, efforts typically revolve around the buildings (and assets) they occupy. However, real estate is one of the most heavily under-digitalised sectors.<sup>51</sup> At present, data is typically published in un-shareable formats, such as pdfs.

### *Case Study: Improving safety in brownfield development<sup>52</sup>*

Brownfield sites, which are often located in central and well-connected areas of towns, provide prime sites for housing developments. These sites typically have existing social infrastructures such as schools and access to the town centre. However, unknown risks linked with human health, ecology and property, and the costs associated with these works present major challenges to developers.

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<sup>48</sup> IPUT Shaping our Cities Report

<sup>49</sup> <https://www.unepfi.org/wordpress/wp-content/uploads/2021/01/Testing-the-application-of-the-EU-Taxonomy-to-core-banking-products-Final-v2.pdf>

<sup>50</sup> <https://www.unepfi.org/wordpress/wp-content/uploads/2021/01/Testing-the-application-of-the-EU-Taxonomy-to-core-banking-products-Final-v2.pdf>

<sup>51</sup> IPUT Shaping our Cities Report

<sup>52</sup> [https://www.snclavalin.com/~/\\_media/Files/S/SNC-Lavalin/download-centre/en/brochure/improving-safety-in-brownfield-development.pdf](https://www.snclavalin.com/~/_media/Files/S/SNC-Lavalin/download-centre/en/brochure/improving-safety-in-brownfield-development.pdf)

Research by Atkins and the Open Data Institute examines data which could help identify potential site development constraints associated with brownfield sites.

This discovery project explores the potential associated with unlocking data used for land contamination risk assessments. The data use for land contamination risk assessments is a combination of open and closed data which comes from a variety of sources and owners and in a range of different formats. The project explored creating a data inventory which could be made available to a wider audience over time.

It is suggested that rather than a data standard, data transfer formats are considered. This format is useful for storage of geo-environmental data as it allows for a wide range of information to be catalogued together. Open data typically does not provide enough information to identify the risks of contamination, for example, and private data is needed for a full analysis. However, private data needs to be purchased which increases the costs of such risk assessments, which can be problematic particularly for smaller developers.

Implementing a data sharing framework could help encourage data sharing across the brownfield development businesses. This framework would focus on;

1. Education and institutional support
2. Standardisation of AGS data format
3. Opening up data
4. Anonymising data to protect individual sites.

#### *Case Study: Increasing trust in ESG data*

ESG data is inconsistent and non-standardised with few data verification and audit approaches. However, there are opportunities to develop new value propositions and opportunities if we were able to collect more granular and timely data. By providing real-time data, asset managers could provide timely analysis of the carbon footprints of investments. Furthermore, there are opportunities for insurance companies to also offer discounts based on the ability to demonstrate sustainability certifications and levels of compliance.<sup>53</sup>

Going beyond company reported information and examining data in asset-level sources, allows businesses to leverage capabilities and develop tools to better assess risks and opportunities associated with climate change. For example, 2 Degrees Investing Initiatives developed a risk model which can analyse the exposure of assets to risks in equity and fixed income portfolios. This allows investors, over multiple scenarios, see gaps in their portfolios.<sup>54</sup>

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<sup>53</sup> <https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/05/frontiers-in-finance.pdf>

<sup>54</sup> [https://securities.bnpparibas.com/files/live/sites/web/files/medias/documents/thoughtleadership/art\\_fintechs\\_esg\\_2019-09-09.pdf](https://securities.bnpparibas.com/files/live/sites/web/files/medias/documents/thoughtleadership/art_fintechs_esg_2019-09-09.pdf)

## Case Study: Tracking footfall trends across a recovering market

Footfall is a key indicator for the nature of high streets, how they are used, how they are changing and their vitality. The fallout of the Covid-19 pandemic has led to decreased footfall on our highstreets, with footfall volumes falling by 89.66% in England at the height of the first lockdown (28<sup>th</sup> March 2020).

Understanding the long-term impact of the Covid-19 pandemic will be essential for occupiers, local authorities, and landlords to develop future strategies. The Local Data Company Footfall sensor uses low-level radar waves to count people walking within a set field of vision. This footfall data adds to better understanding the impact of marketing campaigns, the value of location, a comparison of daytime and night-time economies as well as tracking the impact and recovery post Covid-19.<sup>55</sup>

## Understanding mutual influences of people and space (data for research)

With a likely gradual easing of restrictions thanks to vaccination programmes, CBDs will need to create vibrant environments that support the cultural diversity, wellbeing and functional flexibility that form a resilient platform for knowledge and service workers to work and innovate together.

The importance of physical proximity is increasingly recognised by companies in the knowledge and service economy. Being closest to markets, customers and partners is an important factor for 57% of stakeholders in central business districts surveyed by EY in 2020, an increase of 11 points from 2017.<sup>56</sup> Yet proximity itself is not enough. The quality of urban spaces is considered by 40% of respondents to have strong influence on talent attraction and retention, *with a specific emphasis on the availability of amenities and entertainment during and outside working hours*

After an extended period away from the office, people have become more sensitive to their perception of environmental factors that contribute to their health, including air quality, natural light, water quality and environmental pollution.<sup>57</sup> These considerations don't apply only to the workplace, but to the

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[https://www.flipsofack.com/LocalDataCompany/eb-retail-and-leisure-market-analysis-full-year-2020/full-view.html?utm\\_campaign=FY%202020%20Report%20-%20March%202021&utm\\_medium=email&\\_hsenc=p2ANgtz-\\_590pazZorsYD7FckBS2oQSmITBZ6F5uY1LX91VTF6lX8XFKZqui5F8LieGEOfSc0vTrrz-DgPxdZDITAlWVU3uJv8A&\\_hsmi=117361538&utm\\_content=117361538&utm\\_source=hs\\_automation&hsCtaTracking=7efb32e9-8f3b-485e-919e-b6873c94b65d%7C91e534d2-5aec-4972-952a-4767044b2f88](https://www.flipsofack.com/LocalDataCompany/eb-retail-and-leisure-market-analysis-full-year-2020/full-view.html?utm_campaign=FY%202020%20Report%20-%20March%202021&utm_medium=email&_hsenc=p2ANgtz-_590pazZorsYD7FckBS2oQSmITBZ6F5uY1LX91VTF6lX8XFKZqui5F8LieGEOfSc0vTrrz-DgPxdZDITAlWVU3uJv8A&_hsmi=117361538&utm_content=117361538&utm_source=hs_automation&hsCtaTracking=7efb32e9-8f3b-485e-919e-b6873c94b65d%7C91e534d2-5aec-4972-952a-4767044b2f88)

<sup>56</sup> [https://www.ey.com/en\\_uk/real-estate-hospitality-construction/is-this-the-end-of-the-central-business-district](https://www.ey.com/en_uk/real-estate-hospitality-construction/is-this-the-end-of-the-central-business-district)

<sup>57</sup> <https://www.bbc.co.uk/news/business-55235252>

whole 'going to work' experience, from commute to time spent in the office and social activities.

While research is progressing towards a better understanding of the way physical spaces influences people's sense of wellbeing and happiness, evidence is often limited to surveys and experiments in controlled environments and within limited times, different factors are examined in isolation and their mutual interactions are poorly understood<sup>58</sup>.

On the other hand, an increasing amount of data is being collected in cities, but a large part of it sits behind the organisations that create them.

### **Beyond individual asset performance**

"We are seeing a new paradigm in economic geography: successful

landlords will be stewards of their neighbourhoods rather than just their buildings." Yolande Barnes, Professor of Real Estate at The Bartlett, University College London, UK

To achieve the sustainable outcomes set out by international initiatives at district scale stakeholders such as building owners, asset managers, tenants and local authorities need to pool the data they generate to create a more comprehensive picture of performance at multiple and intersecting scales from buildings, street, and neighbourhoods to the scale of people's experience of door-to-door commutes and daily activities.

## **15 Minute Neighbourhoods**

### **Intro**

"The neighborhood unit is one of the most critical elements for the spatial and functional organization of a city."<sup>59</sup>

The 15-minute city model, developed by Carlos Moreno, strives towards bringing social, economic, and cultural opportunities within 15 minutes of people's homes. Bringing essential urban services directly to citizens can help achieve more sustainable and convenient cities which simultaneously improve the mobility and wellbeing of residents.<sup>60</sup>

An alternative approach in thinking is observed where design strives towards bringing activities to neighbourhoods rather than just bringing people to

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<sup>58</sup> [https://discovery.ucl.ac.uk/id/eprint/10057700/1/Ucci\\_AcceptedPrePublications-Conceptual%20approaches%20to%20wellbeing%20in%20buildings.pdf](https://discovery.ucl.ac.uk/id/eprint/10057700/1/Ucci_AcceptedPrePublications-Conceptual%20approaches%20to%20wellbeing%20in%20buildings.pdf)

<sup>59</sup> Pozoukidou, G. and Chatziyiannaki, Z. (2021) '15-minute city: Decomposing the new urban planning Eutopia', *Sustainability (Switzerland)*, 13(2), pp. 1–25. doi: 10.3390/su13020928.

<sup>60</sup> <https://earth.org/15-minute-city-model/>

activities. This shift deemphasises the accessibility of neighbourhoods and focuses on the proximity to essential urban functions.<sup>61</sup>

The impact of the pandemic has created an opportunity to study how people's lives are impacted when they are forced to rely on their immediate community for many of their day-to-day needs, from entertainment to essential services to green space. A move towards adopting 15-minute cities emphasises the importance of developing essential services around smaller community hubs.

## Risks

The idea of a 15-minute city is not new to urban planning. The principle derives from planning cities around people rather than cars, and many European cities that were planned before the intervention of cars are well suited to this idea.<sup>62</sup>

Beyond planning for access alone, 15-minute cities need to be designed around real community needs taking equality, sustainability, and the different historical contexts of cities into account.<sup>63</sup> Without explicitly acknowledging the inequalities in cities, which have been imposed by technocratic planning methods<sup>64</sup>, 15-minute cities could become agents of gentrification.

Disadvantaged communities see top-down urban improvements as a signal for gentrification, which will mean their near-future exclusion, thereby exacerbating existing inequalities.

## Opportunities

### *Hyperlocal Approach and Community Participation*

Applying 15-minute neighbourhood trends does not erase the need to engage in citizen participation. A bottom-up approach, where neighbourhoods and streets are designed to reflect what the community wants to see, allows for a more authentic process. This bottom up approach aims to connect residents directly to their built environment.<sup>65</sup>

### *The 1 Minute City*

The 1-minute model examines the spaces available on the doorstep level. Examining interventions at the hyperlocal street level allows the public to engage in city development in a way which reflects their community and cultural

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<sup>61</sup> Pozoukidou, G. and Chatziyiannaki, Z. (2021) '15-minute city: Decomposing the new urban planning Eutopia', *Sustainability (Switzerland)*, 13(2), pp. 1–25. doi: 10.3390/su13020928.

<sup>62</sup> <https://www.bloomberg.com/news/articles/2021-03-02/the-downsides-of-a-15-minute-city>

<sup>63</sup> <https://www.bloomberg.com/news/articles/2021-03-02/the-downsides-of-a-15-minute-city>

<sup>64</sup> <https://www.bloomberg.com/news/articles/2021-03-02/the-downsides-of-a-15-minute-city>

<sup>65</sup> <https://earth.org/15-minute-city-model/>

values.<sup>66</sup> Within these small circles around citizens own doorsteps is where they will have the most regular and direct participation, responsibility and ownership of city space.<sup>67</sup>

### *Collective Intelligence Design*

Collecting responses from local communities on a large scale can be a complicated process. Steps to coordinate these ideas and insights are required to solve problems. Collective intelligence can provide this enhanced capacity, meaning that contributions can be collected from a diverse group of people, from a range of sources, such as mobile phones, satellites, and AI technology.

### *Measuring incremental progress*

How do we monitor the social, economic, and environmental outcomes of 15-minute neighbourhood interventions?

15-minute neighbourhoods are also designed to reduce the reliance on owning a car, particularly for low-income families, by providing better walking, cycling and public transport infrastructure. However, ensuring these neighbourhoods don't become gentrified and price out low-income residents is a risk that needs to be managed.

Interventions in urban areas don't end once implemented. Monitoring success is required to determine how successful the plan was and whether the plan met the goals and strategic objectives outlined. Technology and data can play a role in this.

### *Deep Learning and Street Imagery*

Street imagery (to compliment traditional survey-based and admin data sources) can help measure inequalities and monitor the impacts of policies that aim to address them.

### *Empowering communities*

None of this direct engagement and transformation can happen, however, if cities themselves don't have concrete ways to carry it out.<sup>68</sup>

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<sup>66</sup> <https://www.bloomberg.com/news/features/2021-01-05/a-tiny-twist-on-street-design-the-one-minute-city>

<sup>67</sup> <https://medium.com/slowdown-papers/35-slowdown-patterns-one-minute-city-fifteen-minute-city-5bf6eaaaff01e>

<sup>68</sup> <https://www.bloomberg.com/news/features/2021-01-05/a-tiny-twist-on-street-design-the-one-minute-city>